discuss scientific problems of international importance—a definition which covers almost every meteorological problem. The members of this Committee are not official representatives of their countries, and the Committee possesses no financial resources.

After a preliminary interview with M. van Everdingen, it was decided that the Sub-Committee should co-opt as experts the members of the special Committee appointed by the International Meteorological Committee. With a view to achieving a satisfactory result as soon as possible, a meeting of the Sub-Committee and the experts was held directly after the meeting of the experts to discuss a draft prepared by General Delcambre.

These two meetings took place on March 27th and March 29th, 1926, at Paris. At the first meeting, the technical side of the question was discussed and General Delcambre's draft was approved with certain alterations. Finally, the experts drew up a restricted programme, on the basis of which a start could be made, and prepared, in the order of their importance, the following list of the various desiderata to be attained:

(a) Administration of the archives of the national Meteorological Committees and a secretariat of the Committee to maintain relations with international organs interested in meteorology.

(b) Bibliography and retrospective international publications (maps of the Northern Hemisphere, experimental balloons, aeronautical climatology).

(c) Organisation of the ocean meteorological system; assistance in radio-meteorological centralisation and preservation of extracts from ships' logs.

The experts estimate that the minimum cost of carrying out points (a) and (b) of the restricted programme would be 100,000 to 150,000 gold francs.

These were the conclusions submitted at the meeting on March 29th, at which were present: M. Lorentz, Mme. Curie, M. Einstein, M. Luchaire; the experts Messrs. Delcambre, van Everdingen, Simpson, Carvalho, Brandao, J. Bjerknes, Werhlé; M. Roper, representing the International Commission for Air Navigation (I. C. A. N.), and M. de Vos van Steenwyck, whom the Committee of Experts had co-opted to maintain relations with the International Institute for Intellectual Co-operation. M. Lorentz presided over the meeting.

The Chairman proposed that they should not deal with the technical questions, which has been fully discussed at the former meeting. The experts, he pointed out, were unanimous in endorsing the utility of the proposed organisation, and it would not therefore be necessary to go into details. It would be sufficient for them to consider the relations to be established between the future Bureau and the League of Nations through the International Committee on Intellectual Co-operation. The moral support of this Committee might already be regarded as assured. The most urgent question was that of obtaining the material resources necessary for the creation and working of the International Bureau of Meteorology.

The discussion which followed this statement showed that the International Committee on Intellectual Co-operation might take action in two ways simultaneously:

1. The International Committee on Intellectural Co-operation might recommend the League of Nations to invite Governments to accord subsidies to the International Bureau of Meteorology.

2. The International Committee on Intellectual Co-operation might avail itself of the facilities it possessed in the form of the International Institute for Intellectual Co-operation and place at the disposal of the International Bureau of Meteorology provisionally a few rooms in which the Bureau could instal its secretariat and archives. The cost of installation would thus be diminished and the Bureau might begin work almost at once. It would be understood that, as soon as the International Bureau of Meteorology became firmly established and had proved its value, it would have to obtain its own premises and could no longer remain a charge on the Institute, which must be in a position to offer similar hospitality to any other scientific organisation created in similar circumstances. The Director of the Institute does not see any objection to such an arrangement.

There will be some difficulty, however, in the way of carrying out the first proposal. It would not only be desirable to establish the International Bureau of Meteorology, but the matter is, indeed, an urgent one. Several meteorological undertakings are about to be abandoned owing to lack of means, and this would create gaps which it would be impossible to fill later.

It therefore seems essential that the International Committee on Intellectual Co-operation should submit its conclusions to the next (September) Assembly of the League. Unfortunately, the Committee of Experts is not empowered to make any official proposal, as it is merely a Committee of Enquiry instructed by the International Meteorological Committee to submit a report to the Committee at its next meeting on September 20th.

The International Committee on Intellectual Co-operation will not be able to take a decision before its January session, and any action on the part of the League would be deferred for a whole year.

With a view to obviating such delay—which, in the opinion of the experts, would be highly undesirable—the undersigned have the honour to propose the following line of action:

The International Committee on Intellectual Co-operation might forthwith decide in *principle* to co-operate with the International Meteorological Committee for the creation of an International Bureau of Meteorology in accordance with the suggestions set out above. It might authorise the present Sub-Committee to act on its behalf as soon as the International Meteorological Committee has formally approved the scheme drawn up by the experts, so that the recommendations in question may be submitted to the Council of the League at its December session.

As regards the question of premises, a decision might be taken by the Committee of Directors of the Institute.

The representative of the International Commission for Air Navigation has promised to see that, at the next (October) meeting of the Committee, that organisation takes action on the same lines to secure the creation of the International Bureau of Meteorology.

(*Signed*) M. CURIE. (*Signed*) H. A. LORENTZ.
(*Signed*) A. EINSTEIN.

APIA WEATHER DURING 1926 [1]

The following summary for Apia, Samoa, for the year 1926 contains two items of more than ordinary interest, first the occurrence of drought after the great daily rainfall of January 1, 1926:

The total rainfall for the year 1926 at Mulinu'u was 103.54 inches which is 3.31 inches less than the average rainfall for the years 1890–1923. The heavy rains, amounting to 7.02 inches, accompanying the cyclone of January 1, 1926, were followed by eight weeks of comparative drought, broken finally by rains occurring in the first week of March. On March 27 and 28, during the near approach of the cyclone, which later caused serious damage at Palmerston Island and Rarotonga, there was a rainfall of 4.7 inches. April and May were unusually dry, so that at the end of the first five months of the year the rainfall was 18 inches less than the normal. During the summer and continuing until October the rainfall for each month was very close to the average. During November and December the rainfall has been unusually abundant so that the year closed with almost the normal rainfall.

The average temperature for 1926 was 79.76° F., the highest recorded temperature 90.5° F. occurring on January 11 and the lowest 66.2°F. on October 10. The temperature of Samoa has steadily increased during the past 35 years, during which time continuous records have been taken. The winter months—June, July, and August—are now as hot as were the summer months in 1890. For the whole year, the temperature was 2.22° above the average prevailing temperature of 1890.

An analysis of 1,066 cases of deficient rainfall in the United States led me in 1906, to make the following comment:

The one fact which stands out most prominently is that droughty periods are preceded in the majority of cases by a single heavy rain or by several days of light to moderate rains. This appears to be true for both the semiarid regions of the west and the more humid regions of the East and South.

It seems to be a rule of nature that the causes which lead up to a culmination in the march of any meteorological element almost invariably operate to make it difficult for a similar event soon to repeat itself. This is but another way of saying that one extreme is apt to be followed by another in the opposite direction.

In the case of precipitation, as illustrated by the drought in Samoa following the heavy cyclonic rains of January 1, 1926, it may well be that the physical reasons back of the drought are as follows.

Water vapor spreads into the higher atmospheric levels mainly by vertical and horizontal convection. Local vertical convection, as in the thunderstorms of summer,

[1] Samoa Times, Jan. 7, 1927.

involves but a relatively small part of the atmosphere but when horizontal convection comes into play as in the case of strong cyclonic circulations the air in situ over any place is being constantly replaced by air drawn from a distance and if that air be moist heavy precipitation naturally results. As the cyclone center moves away the source of the air supply is changed and more frequently than not, in the United States at least, the new supply comes from a colder and drier region. Vertical convection in this air is not probable, the rain ceases and the chain of events which led up to precipitation must be begun de novo. Thus the natural reaction from heavy rain must be a more or less lengthy period of little or no rain.

The second interesting item in the summary is that temperature in Samoa and, inferentially, over the ocean in that part of the Southern Hemisphere during 1926, was higher than usual. And this fact confirms the advices of high temperature in the Argentine that have come to hand.—*A. J. H.*

IMPROVED TABLES FOR DETERMINING TRUE WIND AT SEA

[EDITOR'S NOTE: With reference to the availability of these tables, the following quotation from a letter from Rear Admiral W. A. Moffett, United States Navy, under date of December 14, 1926, is of interest:

"The values have been computed by the Bureau of Aeronautics and compilation of the tables has just been completed. * * * Printed copies will be available later."]

The wind observed aboard a moving ship is the resultant of the true wind and the ship's movement. The observed wind uncorrected for the ship's movement is usually called the apparent wind. The true wind may be found graphically by laying off one vector representing the ship's course and speed expressed in an opposite direction, laying off the apparent wind as a resultant, and joining the termini of the two quantities to determine the second vector which is the true wind. Mechanical devices which operate on the principle of graphical solution have been used from time to time for this purpose. It is doubtful, however, if either the graphical or the mechanical solution of determining true wind is in general as convenient as a set of suitable tables.

The tables most commonly in use among mariners for obtaining true wind is a single page table such as that given in Table 32 of the American Practical Navigator (Bowditch) and the table on page 5 of W. B. 1201 (Marine, 1923), which express wind velocity in Beaufort force. While this brief table is probably satisfactory for wind observations made without the aid of instruments, it does not afford sufficient refinement for wind velocities obtained by anemometer where wind readings are desired to the nearest mile per hour. A further inaccuracy resulting from the use of the single page table expressed in Beaufort force is caused by the occasional changes which have been made in the mile per hour equivalents to the various force numbers. These changes have been made from time to time as modern tests have improved the accuracy of determinations of the equivalents. Each change in equivalents necessitates a change in certain of the corresponding values of true wind. As a result, the tables in use by various observers are not in agreement.

The expansion in late years of the use of anemometers aboard ship and the need of aviation squadrons operating at sea from a base ship for accurate wind data in knots has created a demand for more detailed tables for converting apparent wind to true wind. Tables for this purpose have just recently been completed.

These contain a separate table for each of the 16 points off the bow from which the apparent wind may blow. Each table provides a column for ship's speeds from 5 to 30 knots at 5-knot intervals. The left hand argument in each table contains apparent wind velocities in knots from calm to 30 knots at 2-knot intervals, from 30 to 46 knots at 4-knot intervals, and above 46 at 10-knot intervals up to 100 knots. The tables are arranged to facilitate interpolation to the nearest knot for any apparent wind velocity up to 100 knots. Intermediate values of ship's speed may be readily interpolated also. Tables appended to the bottom of each page make it easy to convert true wind relative to the ship's bow to true wind in compass points—namely, north, north-northeast, and so on. The tables are arranged so that they may be readily used for wind velocities expressed in other common velocity units, such as meters per second. A device is provided which makes it possible to convert directions to the nearest 16 points of the compass if direction to 32 points is not desired.

The advantages of the new tables over the table now commonly used may be summarized briefly as follows: (1) True wind may readily be determined to the nearest knot (when anemometer is available), thus increasing the accuracy of wind data; (2) a greater choice of ship's speeds is available and interpolations for intermediate ship's speeds are facilitated by the arrangement of the tables; (3) the tables may be used for wind expressed in knots, meters per second, Beaufort force, statute miles per hour or "miles per hour," as indicated by the old style four-cup anemometer. This feature furnishes convenient conversion tables for changing from one velocity scale to another; and (4) the tables appearing at the bottom of each page make it easy to change direction relative to the ship's bow to direction in compass points.—*F. W. Reichelderfer*, Lieutenant, U. S. Navy, Aerological Section, Bureau of Aeronautics.

PILOT BALLOON ASCENTS ON THE WEST COAST OF GREENLAND—A CORRECTION

We have received from Dr. P. L. Mercanton of Lausanne, Switzerland, the following note:

In the Monthly Weather Review, October, 1926, p. 247, "Return of the University of Michigan Greenland Expedition of 1926," I read the following statement:

"Study of the upper air by means of the simple pilot balloons has never before been made over or close to the vast ice-cap of Greenland. * * *"

I might be allowed to correct this: Seven pilot-balloon ascents have been made in August, 1912, at Quervain'shavn, West Greenland (lat. N. 69° 46'; long. W. 50° 15'; alt. 10 m.), by the Swiss Expedition across Greenland, 1912-13. The station lay some quarter of a nautical mile to the south of the Ekip Sermia outlet of the Greenland ice cap and about 3.5 miles to the west of its main border. One of the balloons disappeared in the Ci-Str layer more than 7,000 meters high.

This is, however, by no means the maximum height reached. At Godhavn (Disco Island) the Swiss scientist recorded 16,400 and 22,400 meters on the 11th and 12th of March, 1913, and—last but not least—39,000 meters (about 21 miles) on the 25th of February. No conclusive evidence has been brought against this last record.

No doubt Professor Hobbs failed to discover these ascents of Quervain'shavn in the lot of nearly a hundred managed by the Swiss Expedition [1] and will be glad to have his attention drawn to them.

[1] RESULTATS SCIENTIFIQUES DE L'EXPEDITION SUISSE AU GRÖNLAND, 1912-13, par A. DE QUERVAIN, P. L. MERCANTON, etc. Nouveaux Memoires de la Société helvétique des Sciences naturelles. Vol. LIII, 1920. Suisse.